

IV-01.01 Guidelines

This chapter contains guidelines for the design of structures on the North Dakota State Highway System. The bases for these guidelines are found in the current editions of the following publications:

1. STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES - - AASHTO
2. STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, VOL 1, NDDOT
3. APPLICABLE SECTIONS OF THE FEDERAL AID POLICY GUIDE, 23CFR650
4. NORTH DAKOTA PRESTRESS GIRDER DESIGN AND CHECKING GUIDE, 1990

Prior to the beginning of a design, Bridge Division records will be researched, namely, the correspondence file, the bridge inspection file, the central file, the bridge unique features file (BUFF), the historical bridge candidate list, the hydraulic report (if applicable), and the plans of the existing structure. The Environmental Impact Statement (EIS) or the project concept report (PCR) must also be reviewed. Other items that should be considered are the need for agreements or permits. Once all of these have been studied, the design Section Leader should schedule a pre-design meeting with the Bridge Engineer.

All bridges are identified by their bridge number. The bridge numbers for bridges on the State Highway System are determined by the highway the bridge is on, and the location of the bridge on that highway as indicated by the Reference Point of the center of the bridge. For example: Bridge Number 2-146.366 means that the bridge is located on US Highway 2 at reference point 146.366. The Planning and Programming Division is responsible for the establishment and maintenance of the reference point system. All reference point designations are extended to three decimal places. The bridge number is permanent and does not change due to replacement, regrading, or other factors which might cause minor changes in the bridge location reference point. All structural plans should contain the bridge number, as well as all design records and any other records pertaining to each individual structure.

The primary design method for structures should be Load Factor Design (LFD). Details on the LFD design method can be found in reference 1. above. Working Stress Design (WSD) should be used for designing piling and may be used for designing certain secondary members of structures, or when the design engineer determines that LFD is inappropriate. An HS25 truck should be used for the live load when designing new structures and when practical in rehabilitating existing structures, otherwise an HS20 truck should be used.

The National Bridge Inspection Program requires that every bridge in the state be rated for Inventory and Operating loadings. The ratings should be according to the AASHTO "Manual

for Maintenance Inspection of Bridges” using an HS truck and WSD method except for NHS routes, new structures, and rehabilitated bridges, which should be rated with the LFD method. The Preliminary Engineering and Structural Management Section(Bridge) will rate the bridges.